

Figure: 1
a) Single-photon absorption; b) multiphoton absorption

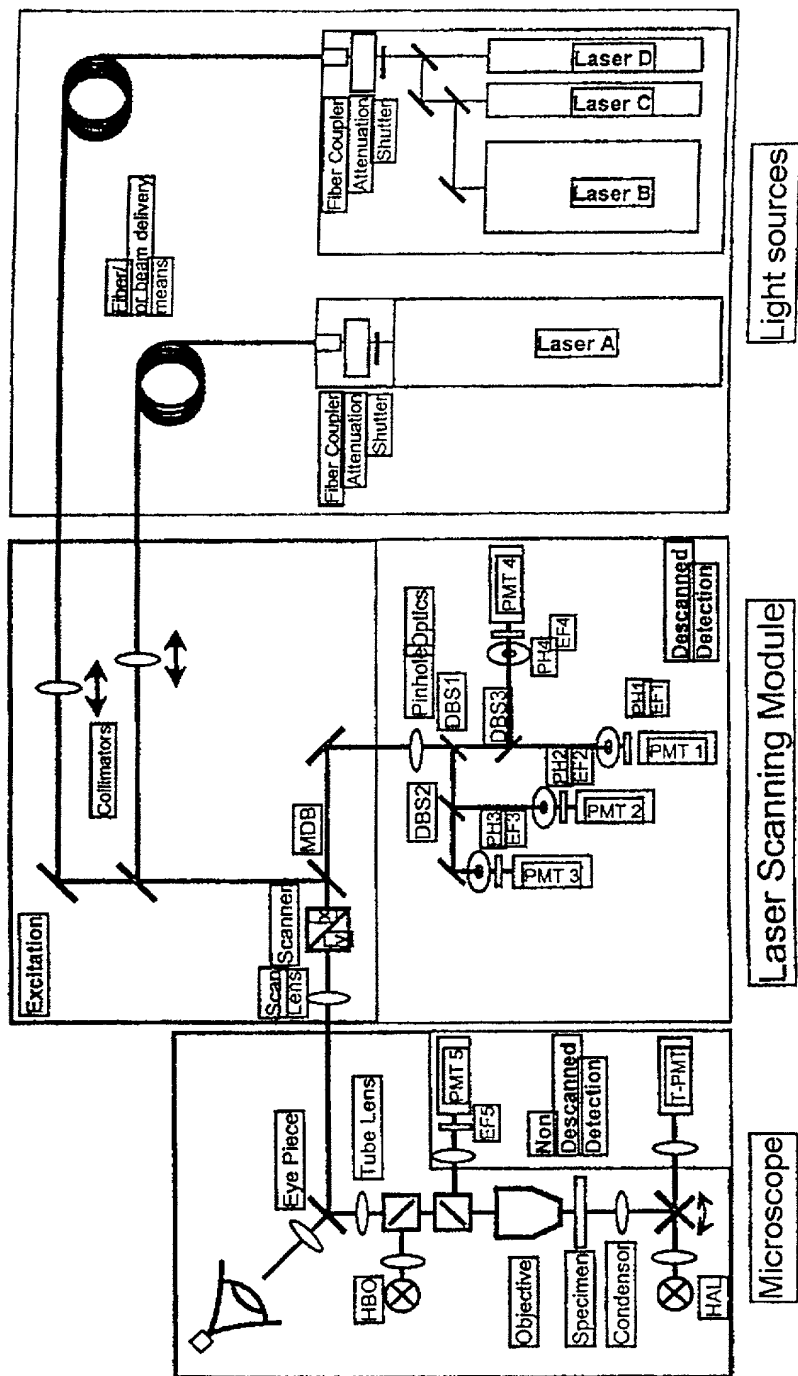
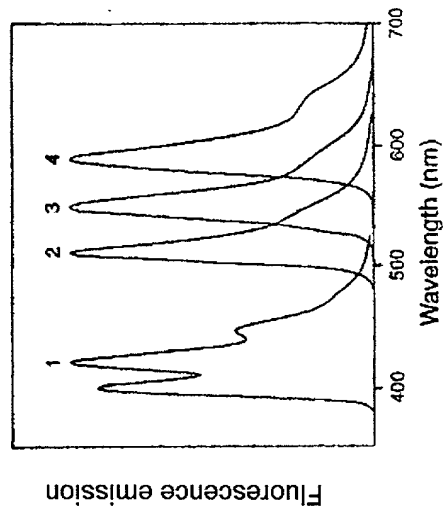
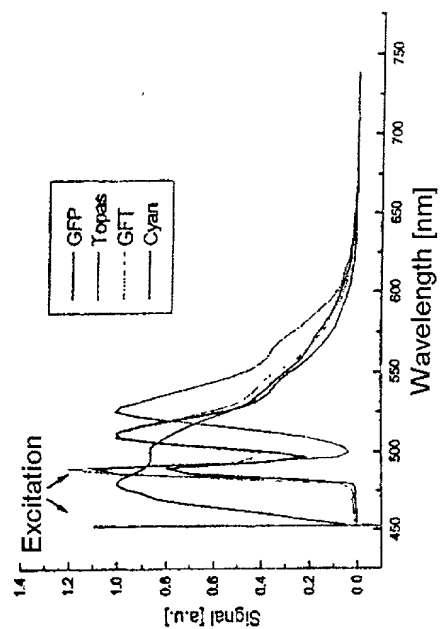
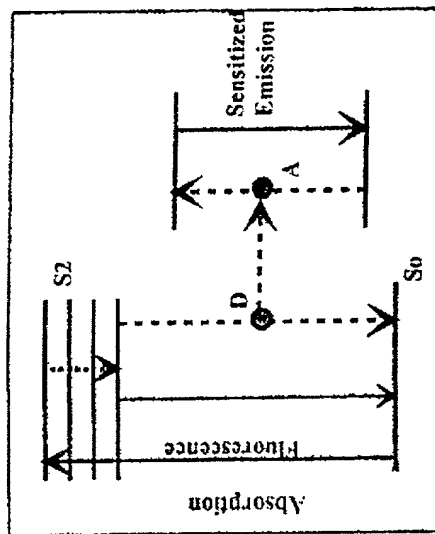


Figure: 2
LSM construction (prior art)

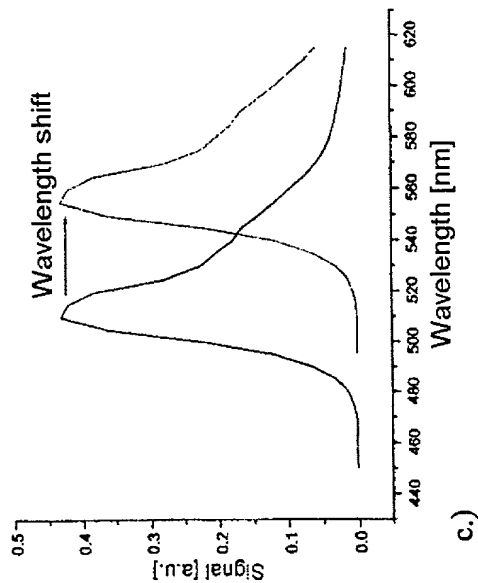


b.)



d.)

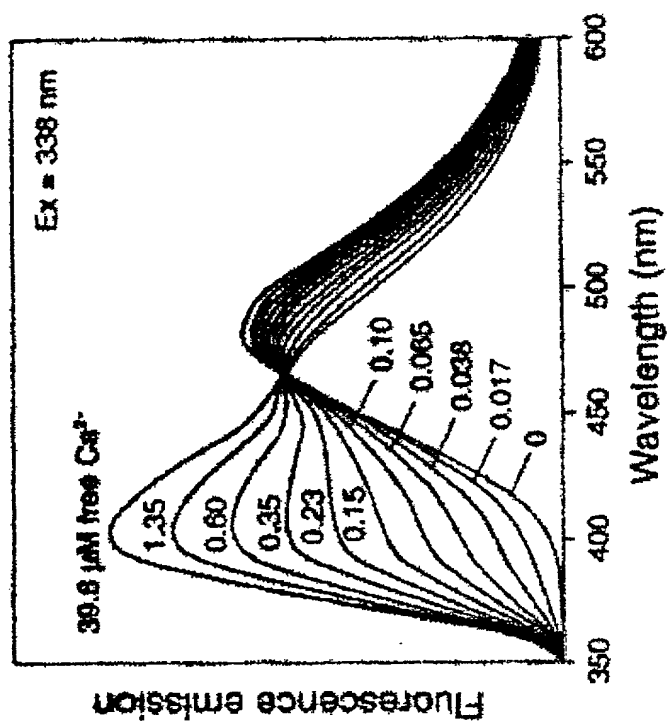
a.)



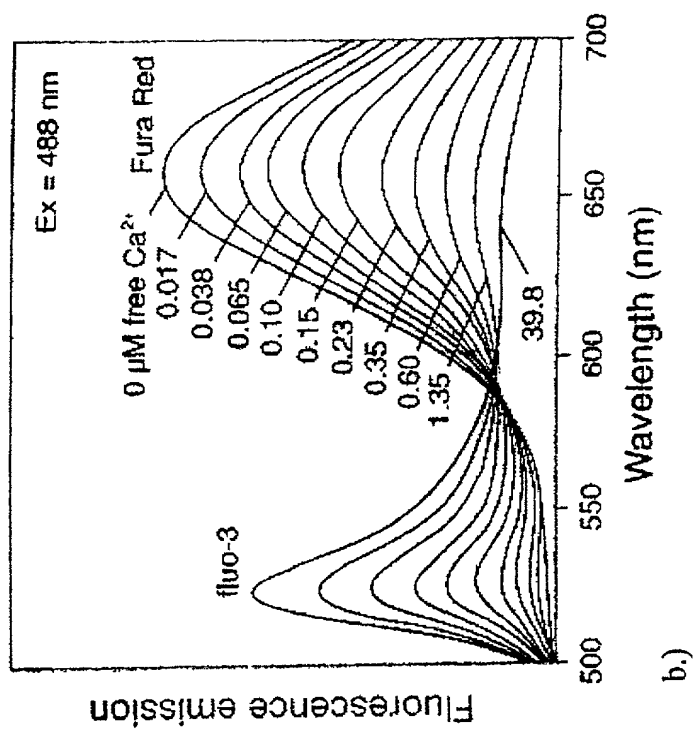
c.)

Figure: 3

Typical spectra: a) dyes; b) fluorescent proteins
c) wavelength shift depending on environment; d) FRET



a.)



b.)

Figure: 4

Typical spectra with ratiometric measurements

a) a dye with emission ratio; b) two dyes with ion-dependent signals

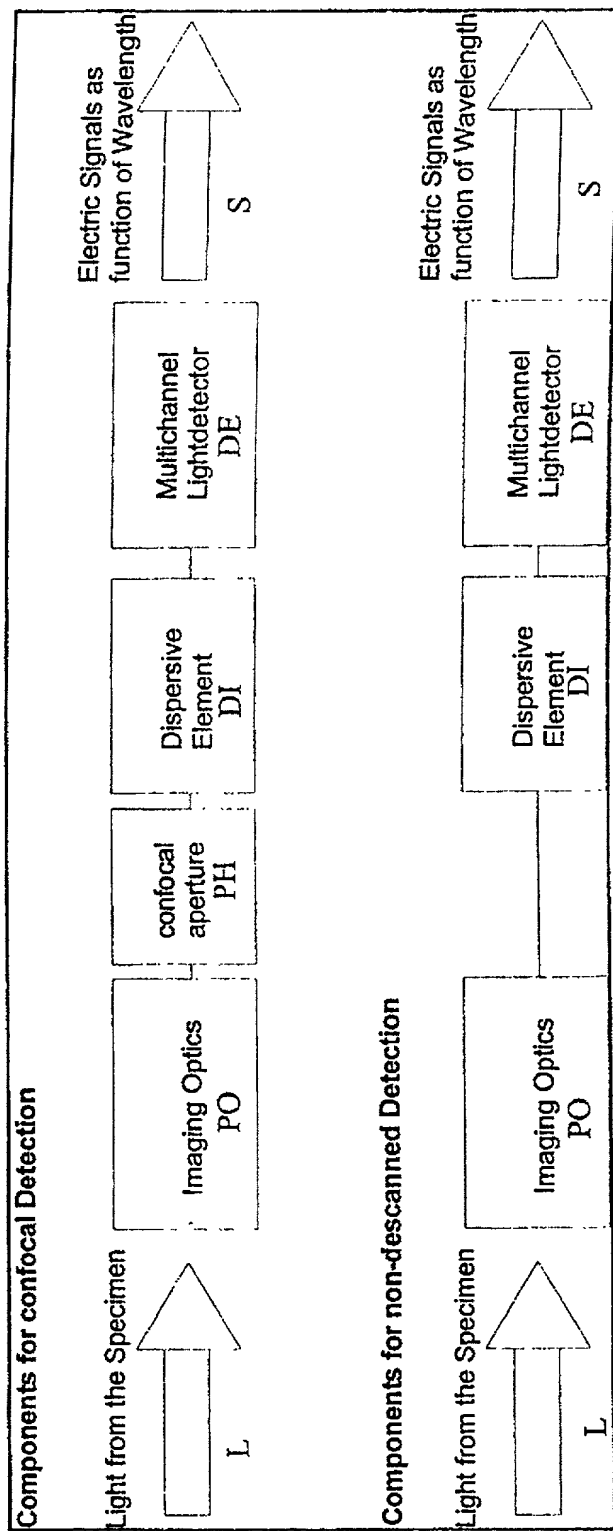


Figure: 5

Block diagram showing construction of detector unit-optics

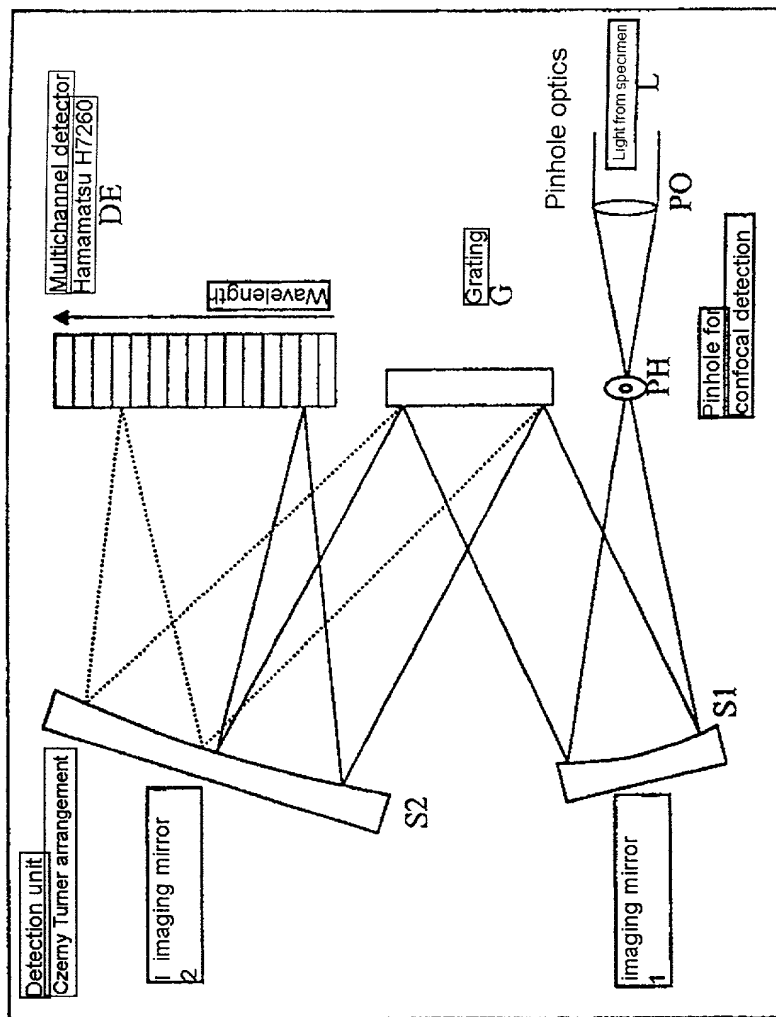


Figure: 6

Example for detector unit-optics construction

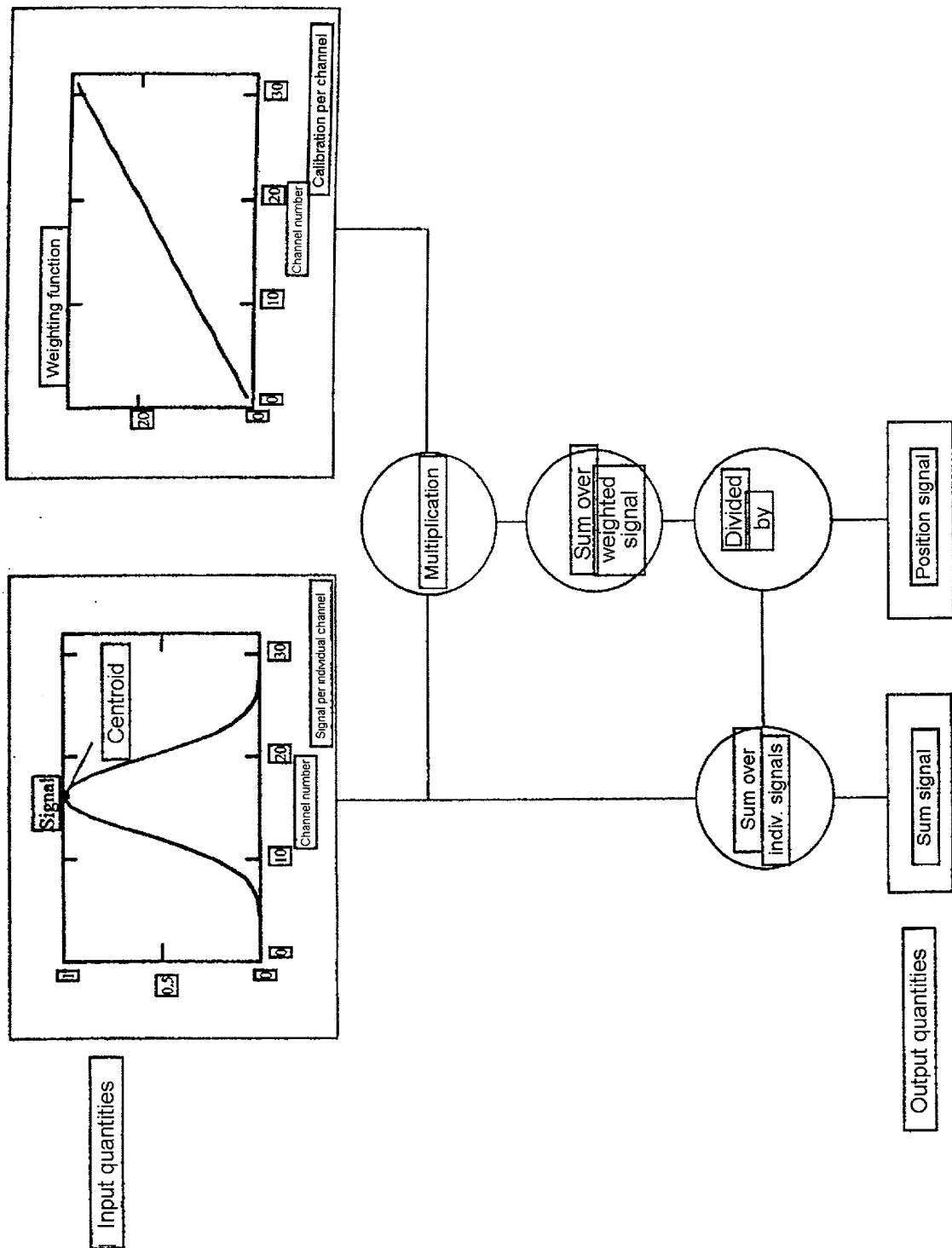
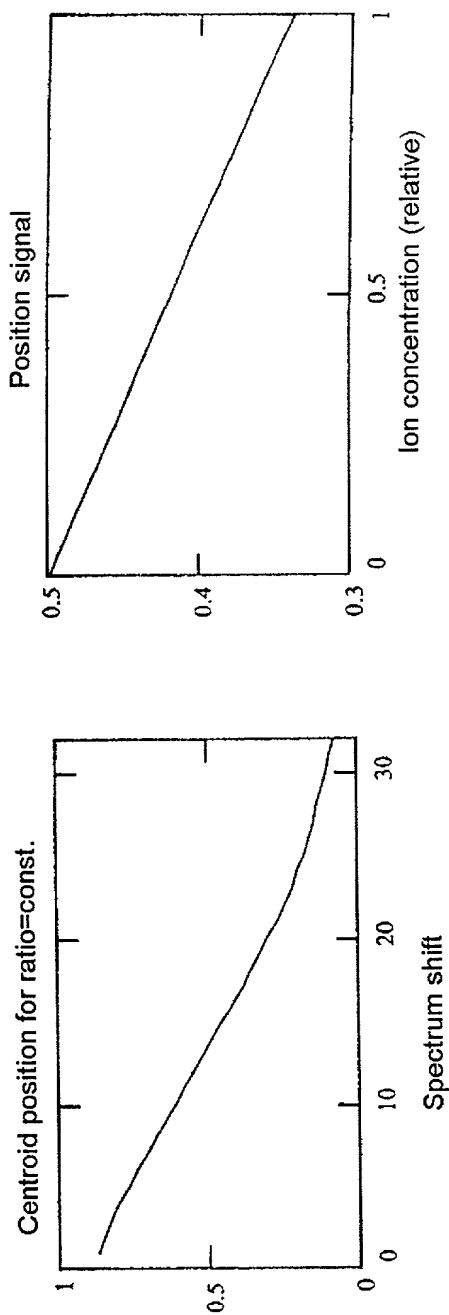


Figure: 7

Algorithm for determining the position of the emission spectrum



a.)

b.)

Figure: 8

Typical curve of position signal as a function of a) position of emission spectrum, b) of ion concentration

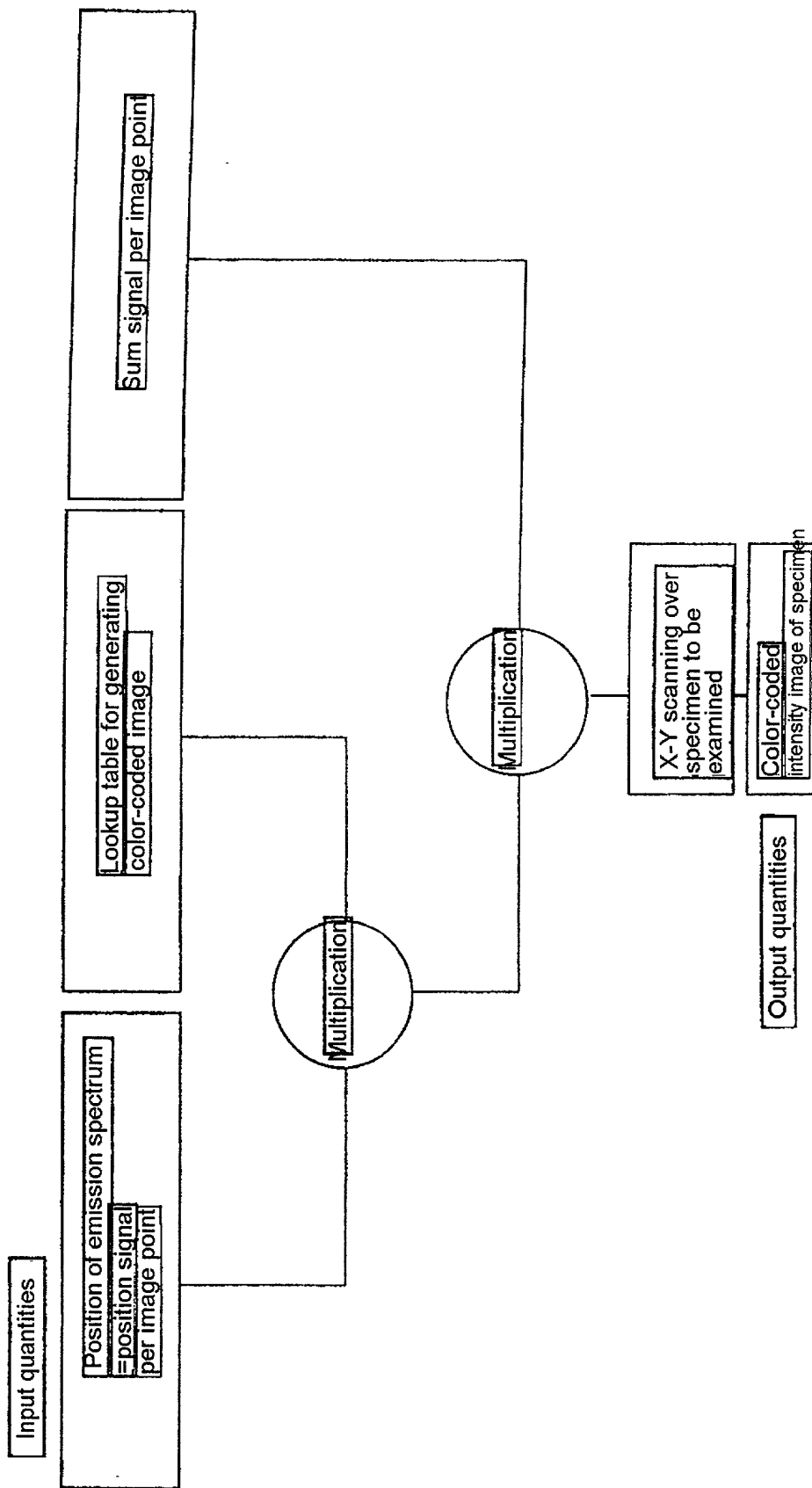


Figure: 9

Algorithm for generating color-coded intensity images using a plurality of dyes

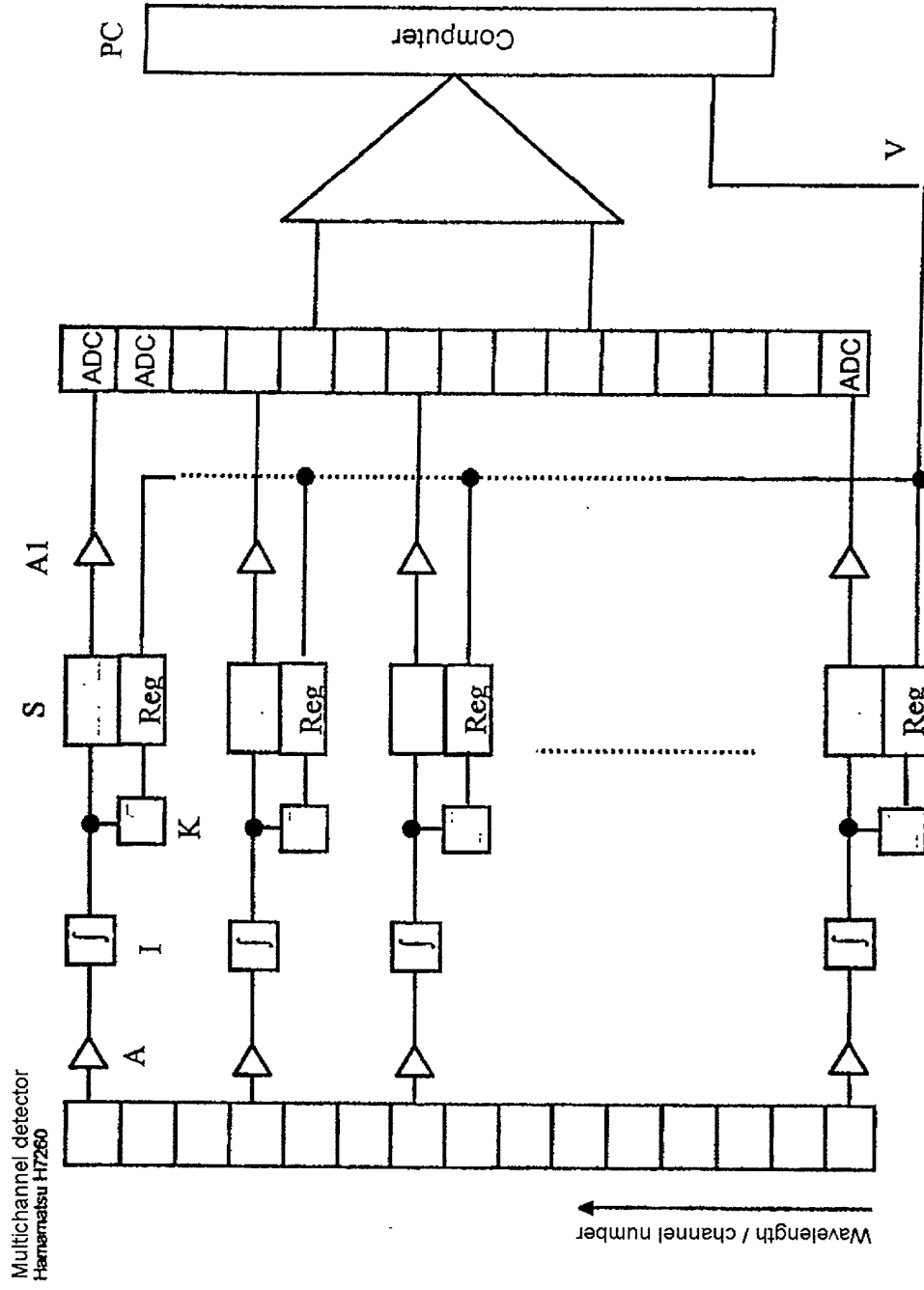


Figure: 10

Construction example of electronics for digital evaluation

Multichannel detector
Hamamatsu H7260

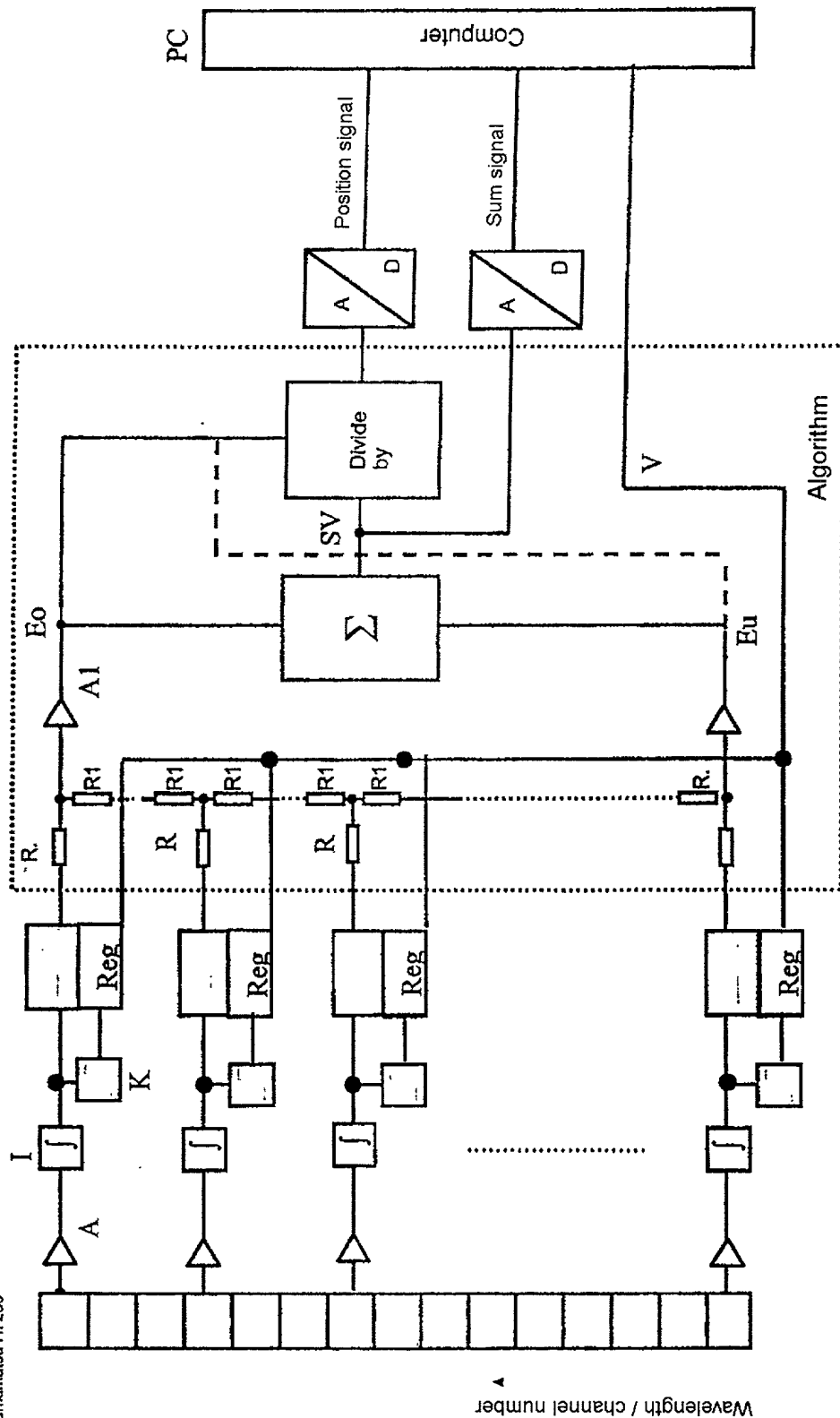


Figure: 11

Construction example of electronics for analog signal evaluation

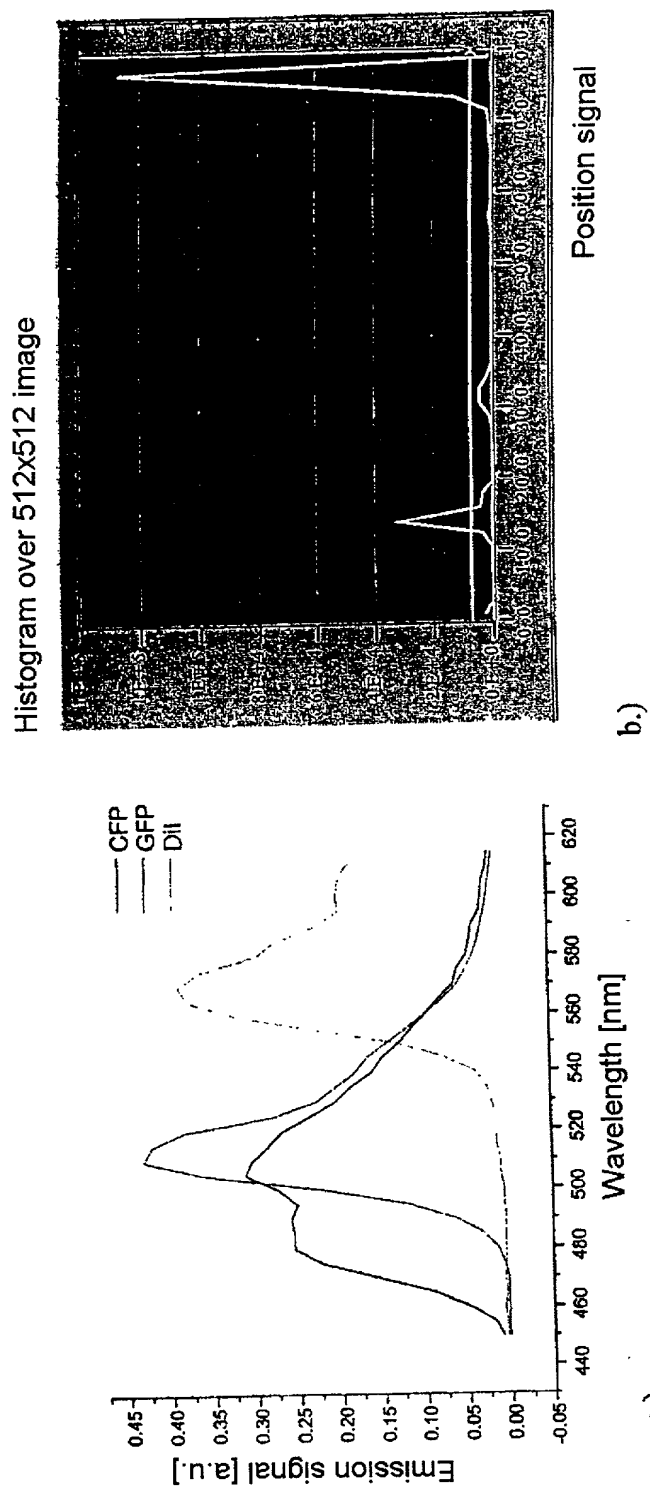


Figure: 12

a) Dye spectra; b) histogram of shift in emission spectra for the dyes shown in a)

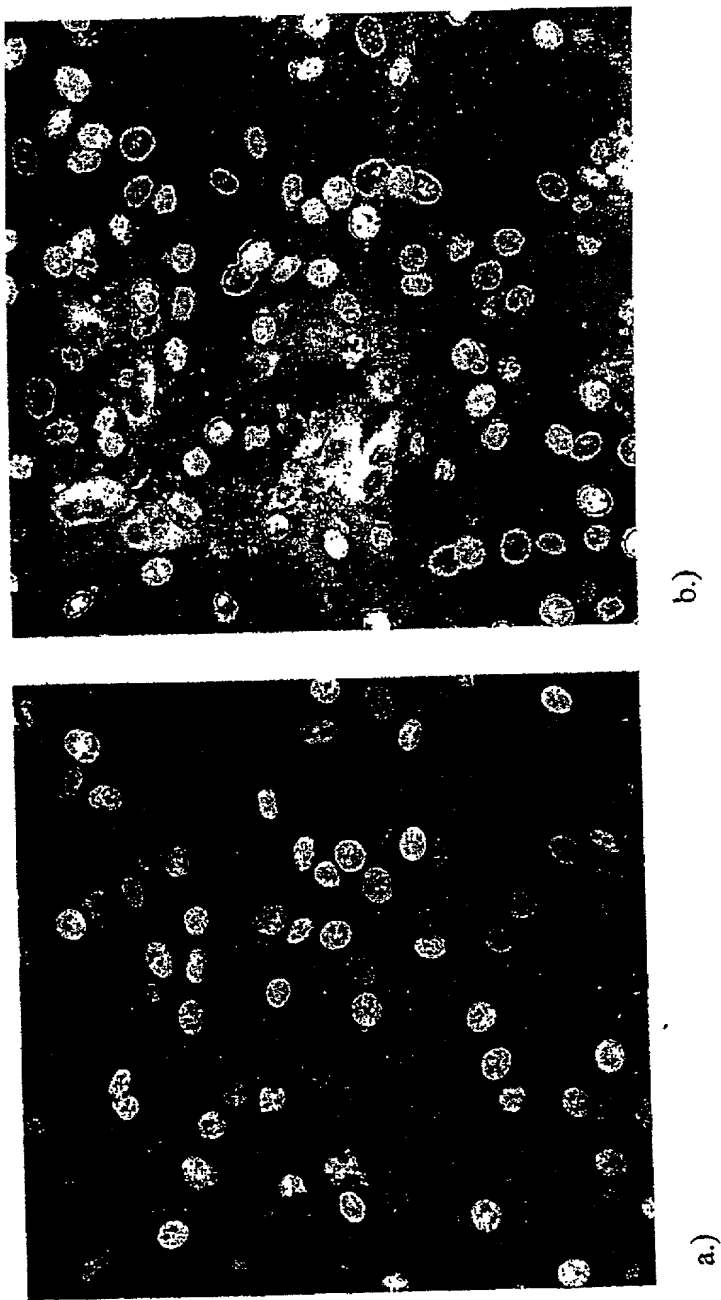
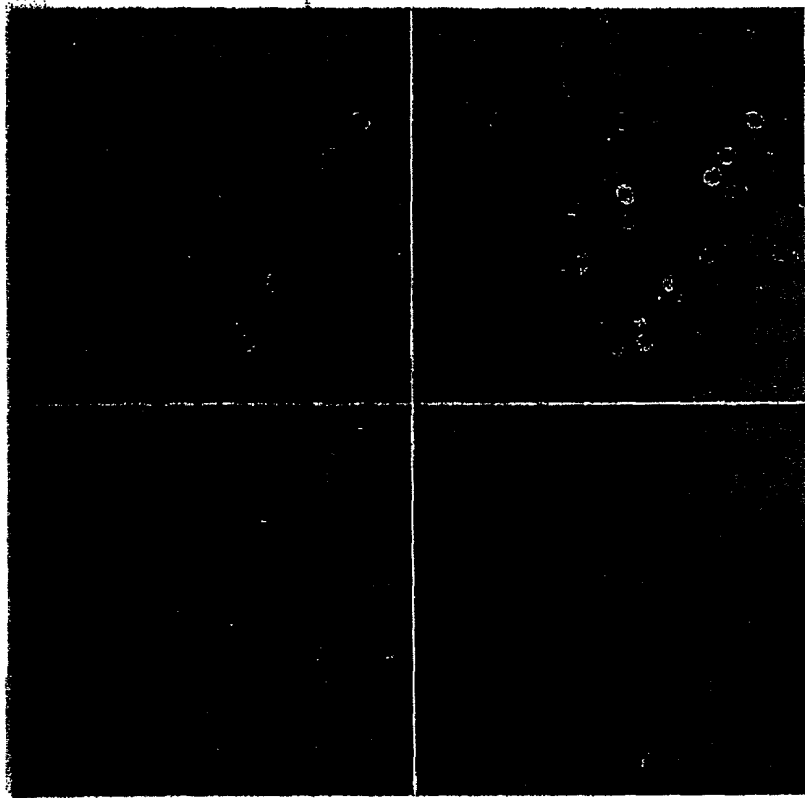
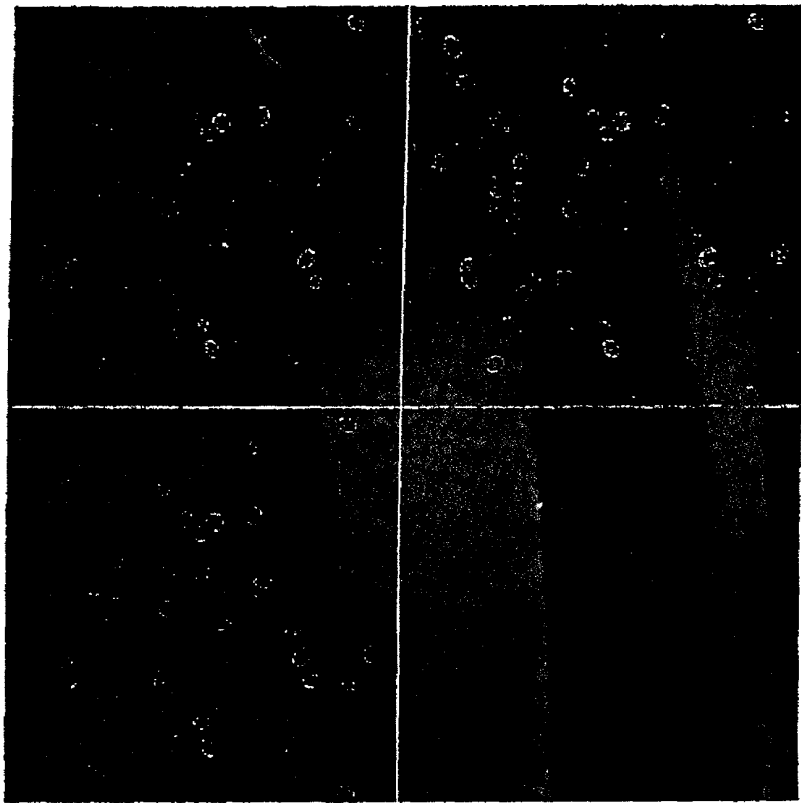


Figure: 13
Experiment for separation of dyes a) sum intensity image; b) image of wavelength shift



c.)



d.)

Figure: 13

c) Unfolded intensity image; d) intensity image with conventional detection according to prior art